Docket No.: 123034-05004739 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	: :	EXPEDITED PROCEDURE Response under 37 CFR 1.116
Kwang Hyo CHUNG et al.	:	
Serial No. 10/671,490	:	Group Art Unit: 1797
Filed: September 29, 2003	:	Examiner: Jyoti Nagpaul

For: DEVICE FOR CONTROLLING FLUID USING SURFACE TENSION

PRE-APPEAL BRIEF REQUEST FOR REVIEW

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Sir:

This paper is submitted in reply to the Final Office Action mailed *December 11, 2007* the rejections therein being maintained in the Advisory Action mailed *March 17, 2007.*

Appellants respectfully request review of the final rejections of claims **1-16** as manifested in the Office Action. No amendments are being filed with this request.

This request is being filed with a Notice of Appeal in compliance with *37 CFR 41.31.*

The review is requested for the reasons stated on the attached sheets.

REMARKS

Claims 1-16 stand finally rejected under 35 U.S.C. §103(a) as obvious over McNeely (U.S. 6,591,852).

At the outset, McNeeley does not teach or suggest all of Appellants' claim limitations. Specifically, Appellants respectfully submit that for at least the four reasons listed below, McNeely fails to disclose, teach, or suggest all elements of independent claim 1.

1. Independent claim 1, recites, *inter alia*, a device wherein:

> "at least one side connecting channel connecting the first capillary stop valve to the second stop valve, wherein the capillary stop valves stop the flow of the fluid in each supply channel and exhaust channel using the surface tension of the fluid, and wherein a flow of fluid through the side connecting channel opens the capillary stop valves." (Emphasis added).

At paragraph 5 of the Office Action, the Examiner asserts that McNeeley discloses wherein the flow of fluid through the side connecting channel 2 opens the capillary stop valves (a and b), as recited by the Appellants. Appellants respectfully disagree.

Unlike the Appellants' claimed device wherein "a flow of fluid through the side connecting channel opens the capillary stop valves," McNeeley appears to only disclose, at column 14, lines 3-12, wherein the fluid blocked by stop valve is opened by a fluid flow through main channel (1), rather than side connecting channel (2). In other words, the Appellants' valve is structurally distinguished from that of McNeeley and indeed, as submitted below, operates not on pressure but on capillary force.

2. Furthermore, although McNeeley discloses opening a stop valve by breaking surface tension, Appellants respectfully submit that McNeeley, at column 14, lines 4-14, discloses wherein

the fluid applied to open the valve is "forced past stopping means 'a' into channel 1." Appellants' stop valve, however, is automatically opened by capillary flow without the application of additional pressure. More specifically, Appellants' fluid, which fills a reaction chamber, flows by a capillary force to break surface tension of a first stop valve, thereby opening the first stop valve. Continuous capillary flow through the side connecting channel then enables surface tension of a second stop valve to be broken, so that the second stop valve is opened. Accordingly, Appellants' device is distinguished from McNeeley in that only capillary force is used to open the Appellants' stop valves.

3. Claim 1 further recites, "at least one flow delay part formed within said side connecting channel and delays flow of the fluid by the surface tension of the fluid." (Emphasis added). Appellants respectfully submit that notwithstanding the assertions of the Examiner, McNeeley fails to disclose this feature.

At column 5, lines 50-59, McNeeley appears to only disclose how a stopping means may be formed, i.e., by a change in channel radius (see Fig. 1D). Appellants submit that one of ordinary skill in the art would understand that a stopping means that stops a flow is not synonymous with a delaying means that only delaying a flow of fluid. Furthermore, the cited text at column 7, lines 33-46, appears to only disclose wherein "a change in channel radius may draw fluid into the channel, rather than impede its flow." Therefore, Appellants respectfully submit that nowhere does McNeeley disclose, teach, or suggest "a delay part" that delays flow of a fluid, as recited in claim 1.

4. Finally, claim 1 further recites wherein the stop valve and the flow delay part are arranged such that "said fluid moves from said storage chamber to said reaction chamber and exhaust chamber using only surface tension and the fluid in said reaction chamber is replaced by a different fluid." (Emphasis added). The Examiner posits that at columns 11 and 12, McNeeley discloses mixing fluids as recited in claim 1. Appellants respectfully disagree. McNeeley appears to only disclose wherein channel 1 and channel 2 are filled with different fluids due to a pressure barrier

between a stop valve and a stop valve b and "wherein the second fluid is forced past the first abrupt microchannel widening into said main microchannel of the fluid circuit, wherein the second fluid is forced past the first abrupt micro channel widening into a second microchannel...." (*See* column 11, lines 33-37, emphasis added). Further still, at column 11, lines 57-59, McNeeley discloses that

> [s]uch a method comprises the steps of stopping advancing fluid in a first microchannel by causing it to engage with a first passive fluid flow barrier, thereby directing fluid into a connected neighboring second microchannel until it engages a second passive fluid flow barrier, applying pressure to said fluid sufficient to overcome one of the first and second passive fluid flow barriers. One of the first and second fluid flow barriers must be weaker than the other, and the weaker fluid flow barrier will be overcome first to permit fluid to flow through to downstream portions of the microfluidic circuit. The first passive fluid flow barrier and the second passive fluid flow barrier are capillary barriers that each have an inlet and an outlet, wherein the inlet is sufficiently smaller than the outlet to create a fluid pressure barrier according to the present invention. (Emphasis added).

Appellants respectfully submit that Appellants method that moves fluid via capillary force, as recited in claim 1 is distinguished from the pressure barrier method disclosed by McNeeley that requires one of the fluid flow barriers to be weaker than the other. Accordingly, not only does McNeeley fail to disclose all the elements of the claim 1, Appellants respectfully submit that the underlying mechanics of the fluid controlling device recited in claim 1 are different than the fluid circuit of McNeeley.

Conclusion

Based upon the above, Appellants respectfully submit that claim 1 is patentable due to the failure of McNeeley to disclose, teach or motivate all recited features of claim 1. Claims 2-16 depend from independent claim 1 and are likewise patentable over McNeeley for at least their dependence on an allowable base claim, as well as for the additional features they recite. Accordingly, the rejection of claim 1 under 35 U.S.C. §103(a) is improper and withdrawal of the rejection over McNeeley is respectfully requested.

To the extent necessary, a petition for an extension of time under *37 C.F.R. 1.136* is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
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